Ecoregions

Ecoregions are areas in which similar climate, landforms, and soil exist and support similar communities of vegetation and animals. People affect natural systems within an ecoregion through such activities as agriculture, development, the creation of protected areas, hunting, and the introduction of non-native species. Natural resource protection efforts throughout an ecoregion may share many of the same approaches and techniques, since these efforts often focus on maintaining or restoring similar communities of indigenous animals and plants. Hence, many challenges of resource protection can be fruitfully addressed at the ecoregional level. The Blue Ridge Parkway region includes parts of two ecoregion divisions; a large portion of the counties are classified as part of the Hot Continental Regime Mountain division. While the eastern most portions of five counties in Virginia (Amherst, Bedford, Franklin, Nelson, and Patrick) and four counties in North Carolina (Burke, Caldwell, Surry, and Wilkes) are classified as part of the Subtropical division.

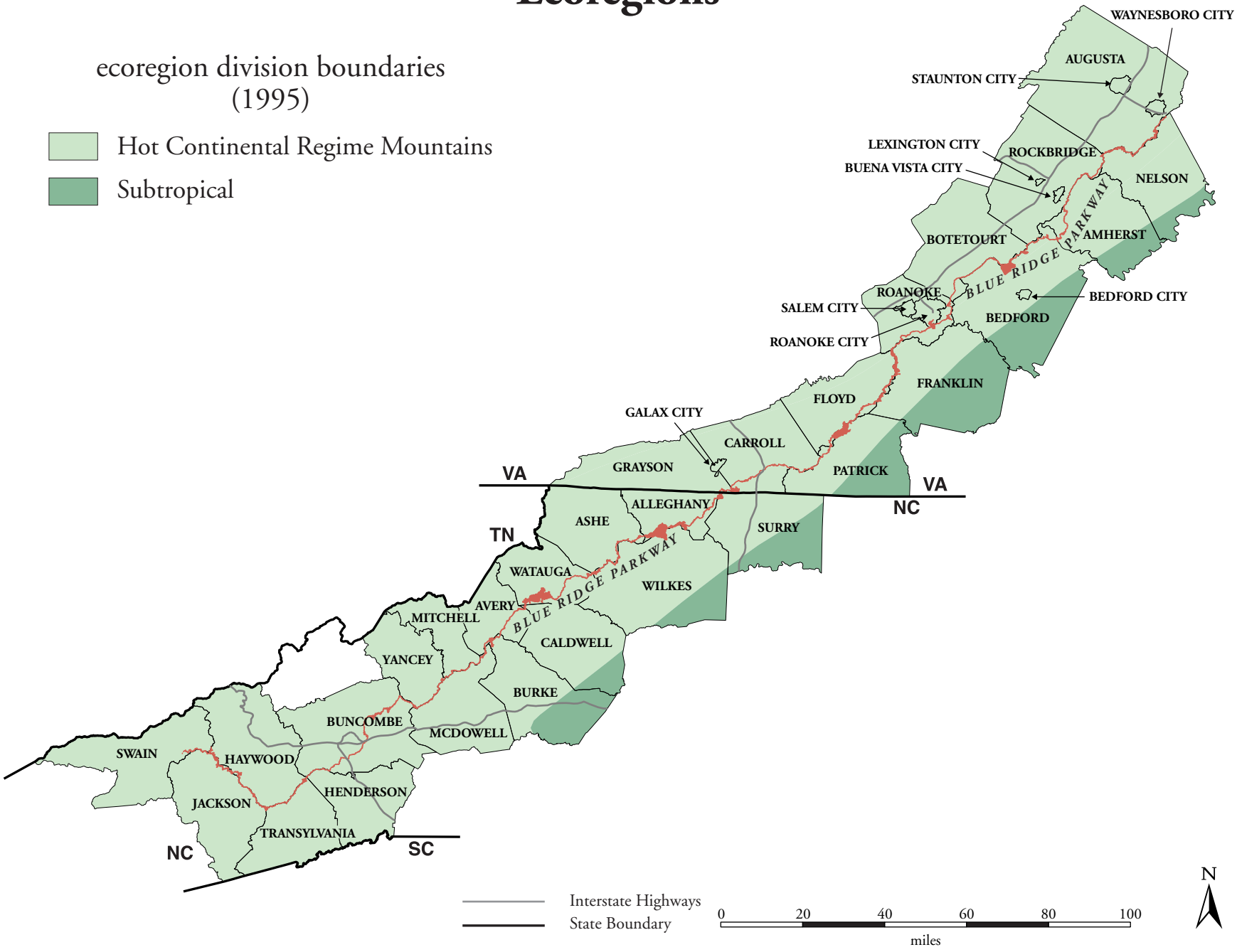
Bailey's Ecoregions

Ecoregions are ecosystems of regional extent, differentiated according to a hierarchical scheme which uses climate and vegetation as indicators of the extent of each unit. Ecoregional classifications were developed by Robert Bailey of the U.S. Forest Service, U.S. Department of Agriculture (Bailey, Robert G. 1995. Description of the ecoregions of the United States (2nd edition). Misc. Pub. No. 1391, Map scale 1:7,500,000. Following are abridged descriptions of the two ecoregions which overlay the Blue Ridge Parkway region.

Hot Continental Regime Mountains – climate is temperate, with distinct summer and winter, and all areas are subject to frost. Precipitation is distributed throughout the year, large snow accumulation occurs in the winter. Typically composed of an oak-pine forest mix. Chestnut was once abundant here, but a blight has eliminated it as a canopy tree.

Subtropical – hot summers with high humidity and mild winters, but frost still occurs nearly every winter. Precipitation is distributed evenly throughout the year, a peak occurring during midsummer or early spring in the form of thunderstorms. Summer droughts can occur, snow falls rarely and melts almost immediately. Typically composed of broadleaf deciduous and needleleaf evergreen trees.

Ecoregions

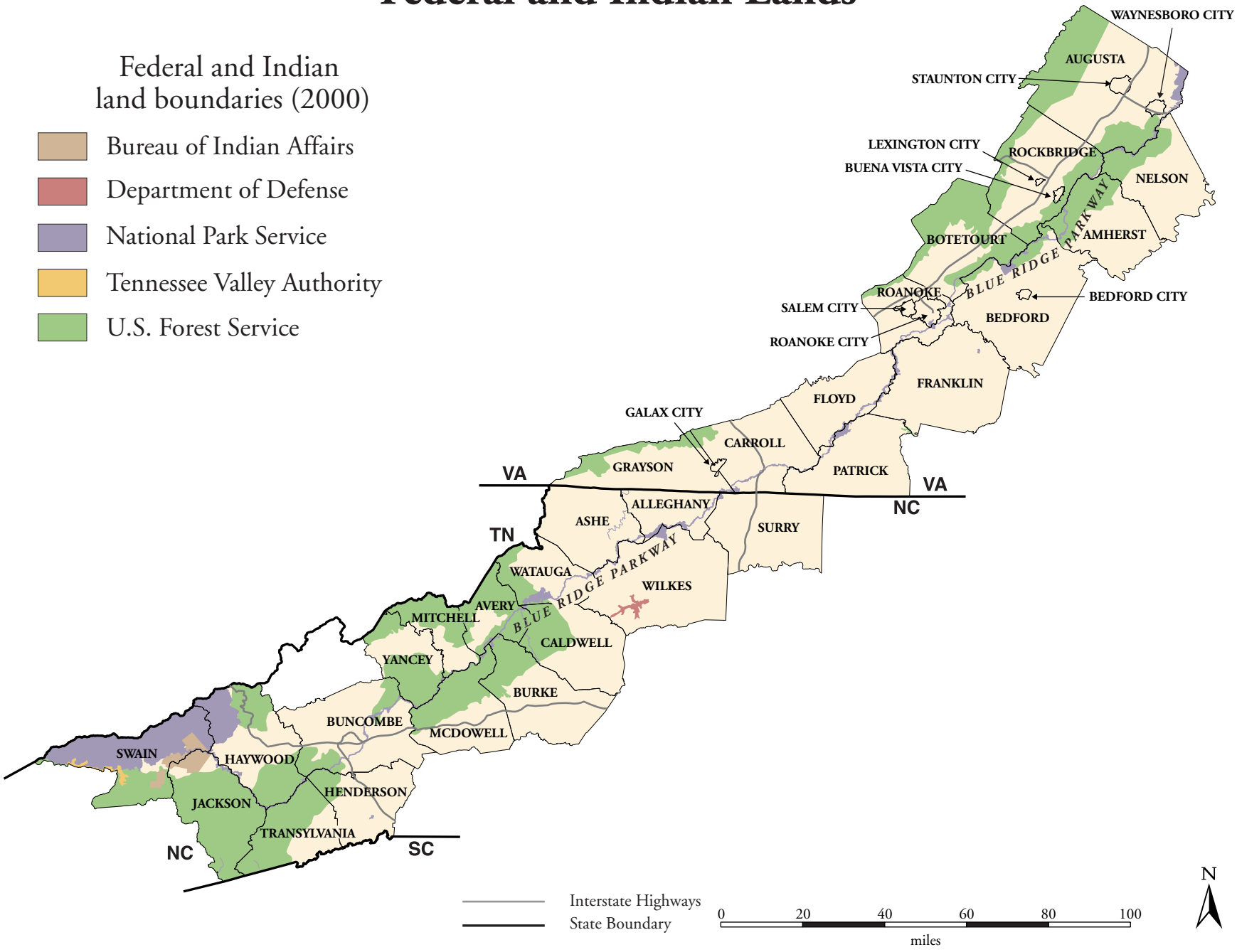

ecoregion division boundaries
(1995)
Hot Continental Regime Mountains
Subtropical
WAYNESBORO CITY
AUGUSTA
STAUNTON CITY
LEXINGTON CITY
BUENA VISTA CITY
ROCKBRIDGE
NELSON
BOTETOURT
AMHERST
BLUE RIDGE PARKWAY
ROANOKE
BEDFORD CITY
SALEM CITY
BEDFORD
ROANOKE CITY
FRANKLIN
FLOYD
GALAX CITY
CARROLL
VA
GRAYSON
PATRICK
VA
NC
ALLEGHANY
ASHE
SURRY
TN
WATAUGA
WILKES
AVERY
MITCHELL
BLUE RIDGE PARKWAY
CALDWELL
YANCEY
BURKE
BUNCOMBE
MCDOWELL
SWAIN
HAYWOOD
HENDERSON
JACKSON
TRANSYLVANIA
NC
SC
Interstate Highways
State Boundary
0 20 40 60 80 100
miles
N

Federal and Indian Lands

National park units, administered by the National Park Service are part of a larger system of public lands. Other federal agencies that administer public lands within the region are: the Bureau of Indian Affairs, the Bureau of Land Management, the Department of Defense, the Forest Service, and the Tennessee Valley Authority. Public lands administered by one agency often share boundaries with public lands administered by other agencies. Knowledge of the broader pattern of public land management regimes can help park managers to collaboratively plan natural resource protection efforts. [19]

NOTES

Federal and Indian Lands

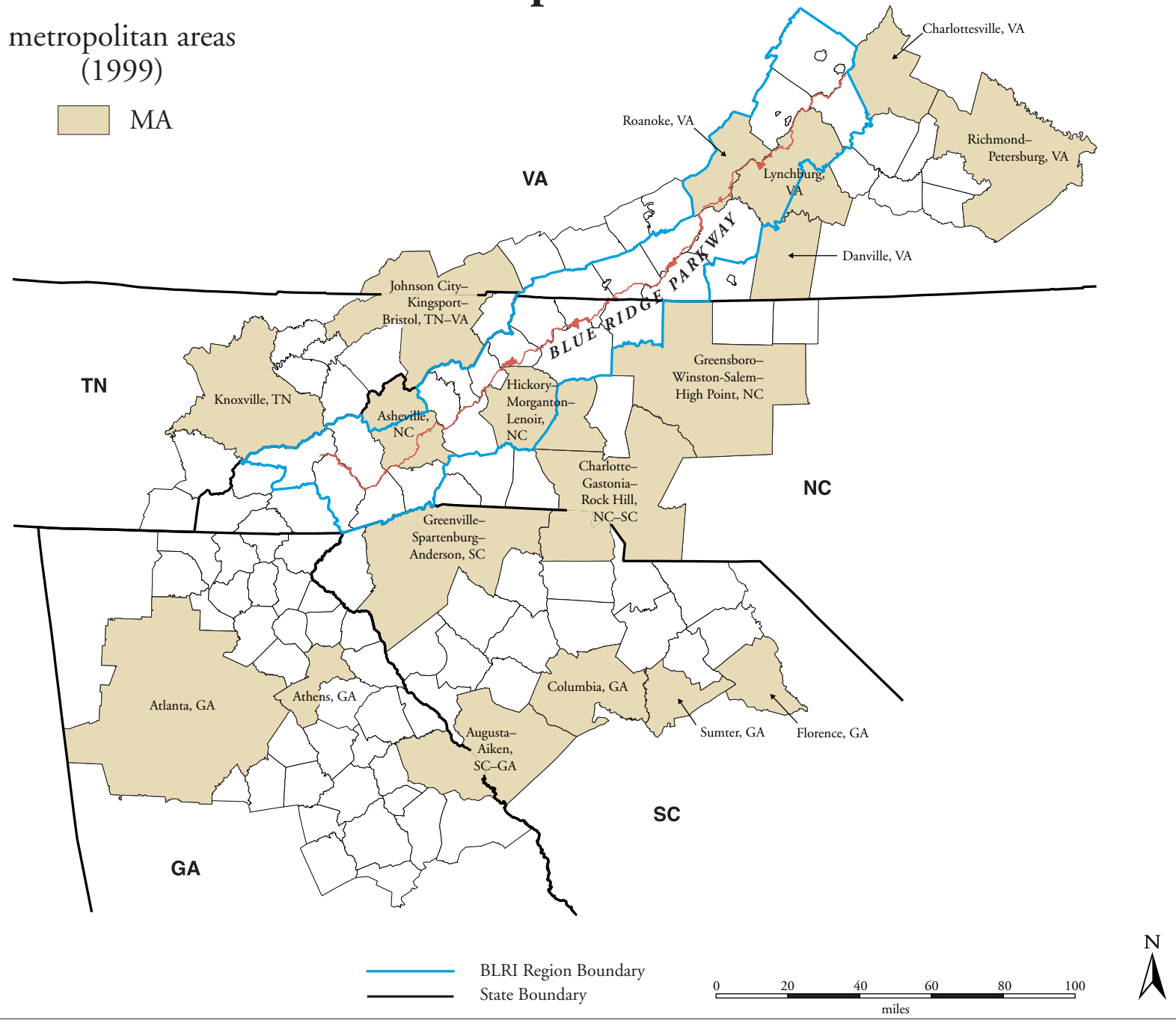


Metropolitan Areas

Metropolitan areas are densely populated urban areas. The Census defines a metropolitan area (MA) as having a large population nucleus, together with adjacent communities that have a high degree of economic and social integration with that nucleus. Some MAs are defined around two or more population nuclei. Each MA must contain either a place with a minimum population of 50,000 or a U.S. Census Bureau defined urbanized area and a total MA population of at least 100,000. The following map of the southeastern U.S. displays 18 metropolitan areas that surround the Blue Ridge Parkway region of interest.[20]

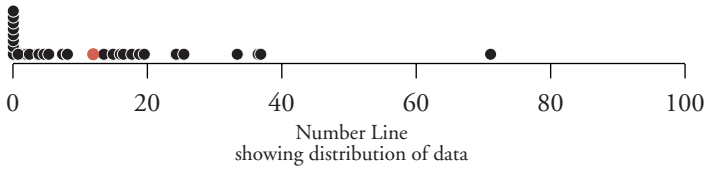
NOTES

Metropolitan Areas



Federal Land Management

One indicator of the federal government's role in regional resource management is the amount of land under federal management. This amount can be measured as a percentage of the total land area in each county. Stewardship of private land is carried out through a combination of regulation, market forces, and voluntary action. In contrast, stewardship of public land is carried out through direct implementation of agency policies. Thus the variation in public versus private land management across the park region can significantly influence the design and implementation of resource protection strategies. Within the Blue Ridge Parkway region, land under federal management (2001) ranges from 0% (Bedford City) to 71% (Swain).[21]



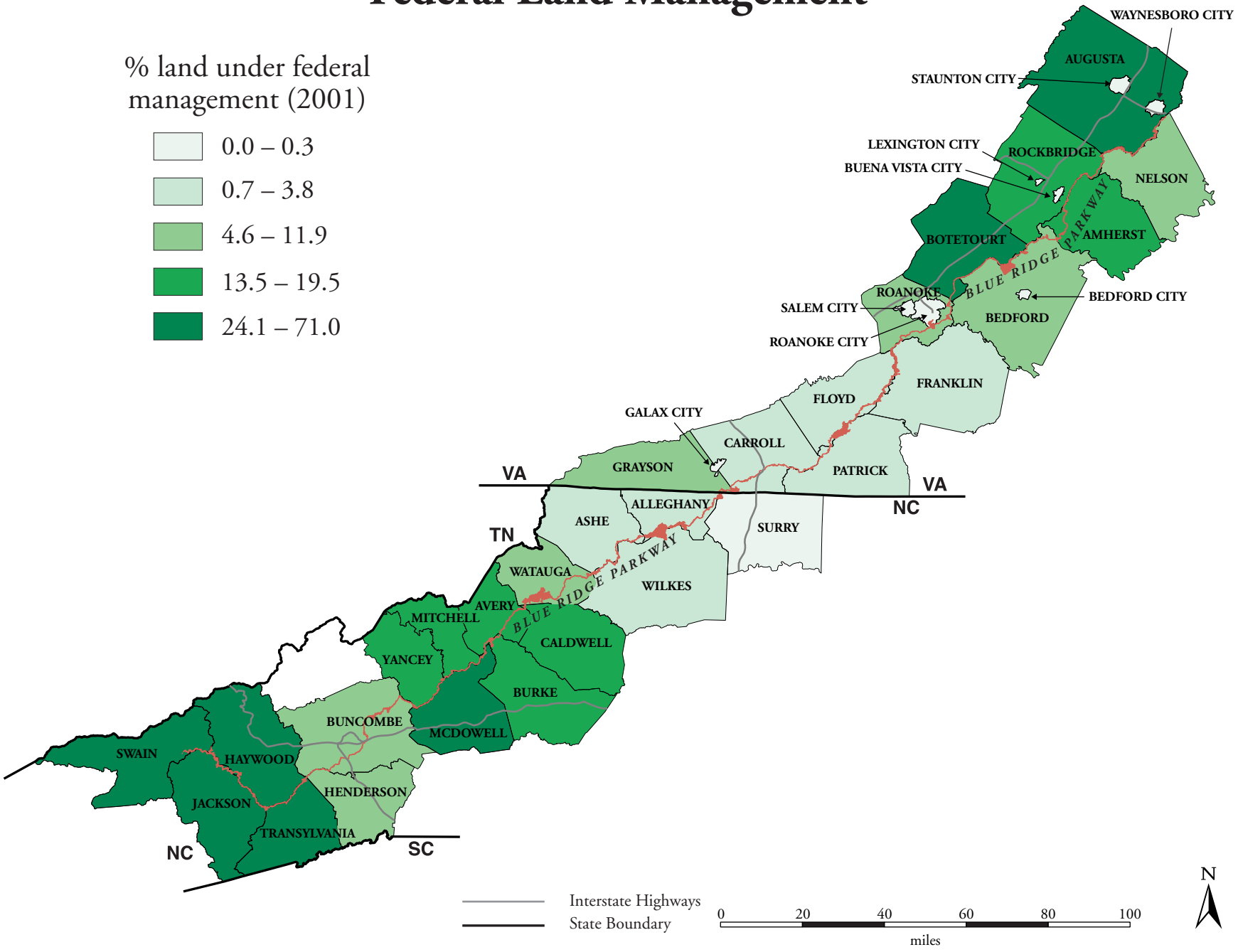
Number Line
showing distribution of data

NOTES

% land under federal management (2001)

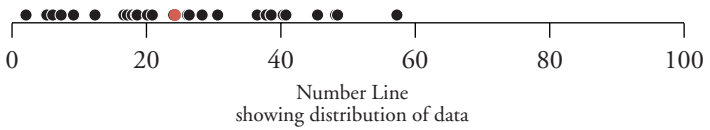
Surry	0.3	Rockbridge	17.7
Ashe	0.7	Avery	18.8
Floyd	1.6	Yancey	19.5
Franklin	1.6	McDowell	24.1
Wilkes	2.0	Botetourt	24.3
Patrick	2.5	Jackson	25.4
Carroll	3.5	Augusta	33.3
Alleghany	3.8	Haywood	36.5
Watauga	4.6	Transylvania	36.8
Roanoke	4.9	Swain	71.0
Bedford	**5.3**	Bedford City	0
Henderson	7.3	Buena Vista City	0
Buncombe	8.1	Galax City	0
Nelson	8.1	Lexington City	0
Grayson	11.9	Roanoke City	0
Mitchell	13.5	Salem City	0
Burke	14.9	Staunton City	0
Amherst	15.9	Waynesboro City	0
Caldwell	16.4		

Federal Land Management



Farmland

The relative importance of farming within a county can be indicated by the percentage of the county's total land area that is classified as farmland. Farming includes crop cultivation as well as pasturing and grazing of livestock. Because damaged or degraded natural resources present a long-term threat to the health and profitability of farming, farm operators are potentially key partners in local and regional resource protection issues. Park management can require close coordination with area farmers on many issues, such as control of nonnative species, species reintroduction, preservation of scenic values, allocation of scarce water supplies, or management of agricultural runoff. Within the Blue Ridge Parkway region, the percentage of total county land area classified as farmland (1997) ranges from 2% (Swain) to 57.2% (Alleghany), with no data reported for the independent cities of Virginia.[22]



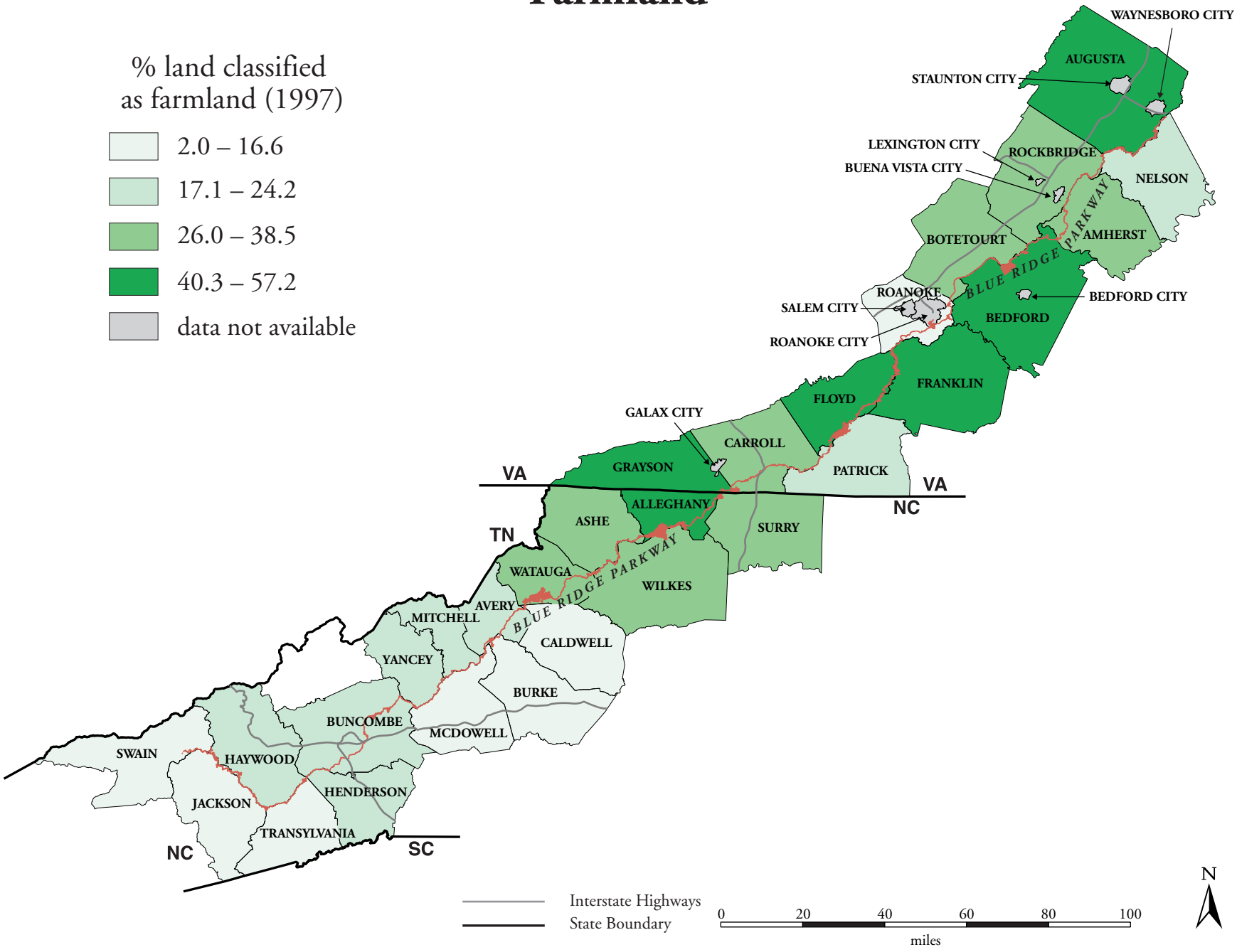
Number Line
showing distribution of data

NOTES

% land classified as farmland (1997)

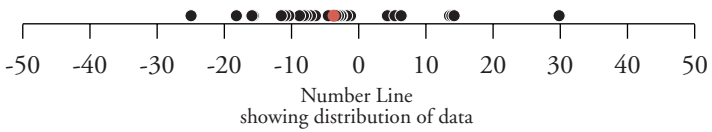
Swain	2.0	Botetourt	26.0
Transylvania	5.2	Wilkes	26.3
Jackson	6.0	Watauga	28.2
McDowell	7.3	Amherst	30.5
Burke	9.1	Rockbridge	36.5
Caldwell	12.3	Surry	37.8
Roanoke	16.6	Carroll	38.5
Avery	17.1	Ashe	38.5
Mitchell	17.8	Bedford	40.3
Haywood	18.4	Franklin	40.7
Henderson	18.6	Augusta	45.4
Yancey	20.1	Grayson	48.1
Buncombe	20.8	Floyd	48.4
Patrick	24.0	Alleghany	57.2
Nelson	**24.2**		

Farmland


% land classified as farmland (1997)
2.0 – 16.6
17.1 – 24.2
26.0 – 38.5
40.3 – 57.2
data not available
WAYNESBORO CITY
AUGUSTA
STAUNTON CITY
LEXINGTON CITY
BUENA VISTA CITY
ROCKBRIDGE
NELSON
BOTETOURT
AMHERST
BLUE RIDGE PARKWAY
ROANOKE
SALEM CITY
ROANOKE CITY
BEDFORD
BEDFORD CITY
FRANKLIN
FLOYD
GALAX CITY
CARROLL
GRAYSON
PATRICK
VA
NC
ALLEGHANY
ASHE
SURRY
TN
WATAUGA
WILKES
AVERY
MITCHELL
YANCEY
CALDWELL
BURKE
BUNCOMBE
MCDOWELL
SWAIN
HAYWOOD
HENDERSON
JACKSON
TRANSYLVANIA
NC
SC
Interstate Highways
State Boundary
0 20 40 60 80 100
miles
N

Change in Farmland

Changes in the amount of farmland provide an indication of economic and land use trends among counties in the park region. Land can be converted to farming because of increased demand for agricultural products or because new technology, business practices, or government programs make farming profitable. Land can be taken out of farming due to soil depletion, competition from other growers elsewhere, loss of labor, or conversion of land to other (often urban) uses. Within the Blue Ridge Parkway region (1987-1997), the change in the amount of farmland ranged from a decrease of 24.9% (Henderson) to an increase of 29.8% (Avery), with no data reported for the independent cities of Virginia.[23]



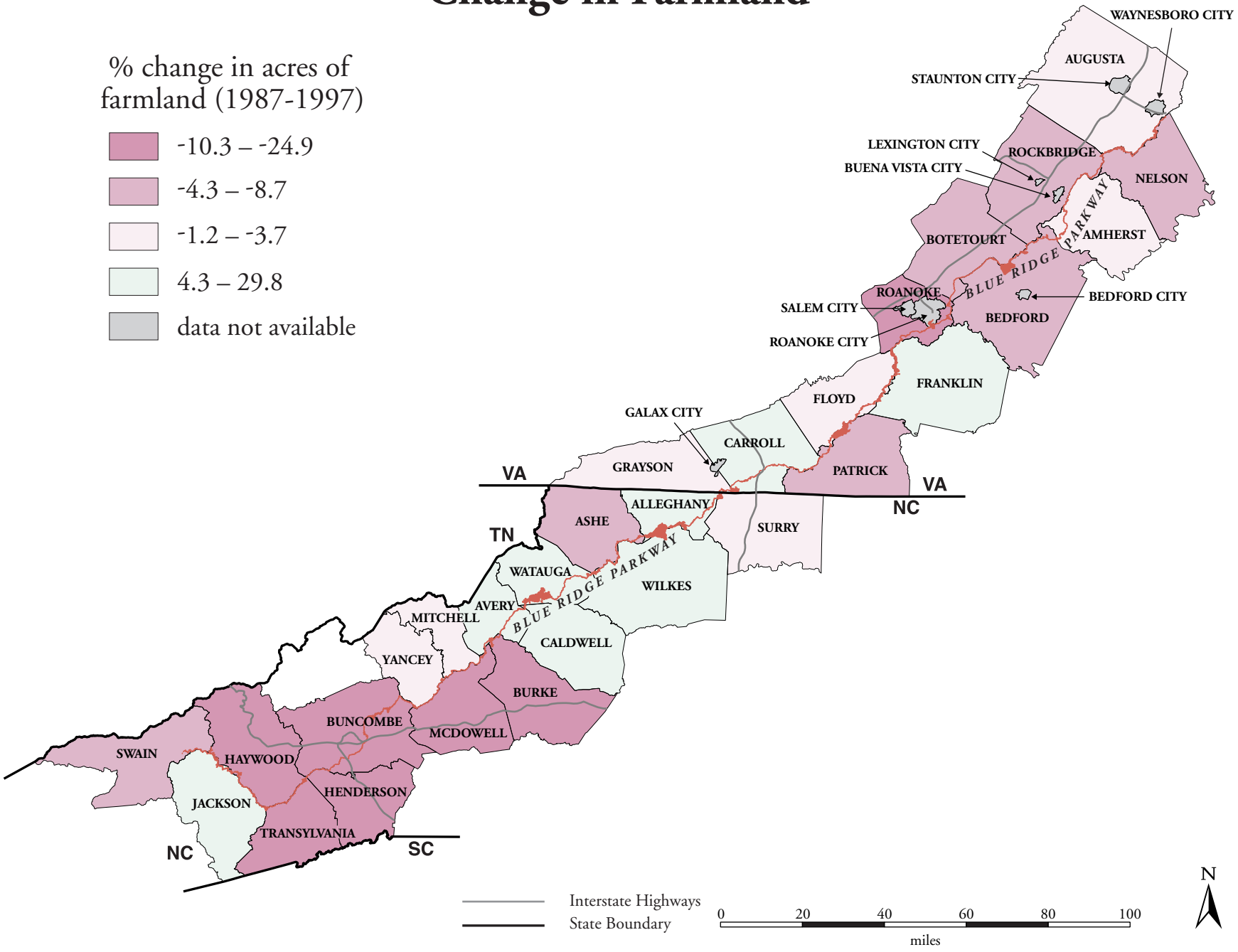
Number Line
showing distribution of data

% change in acres of farmland (1982-1997)

Henderson	-24.9	Augusta	-3.4
Haywood	-18.1	Yancey	-3.0
Buncombe	-15.9	Grayson	-2.6
Burke	-15.7	Surry	-2.5
Transylvania	-11.5	Mitchell	-1.8
McDowell	-10.9	Amherst	-1.2
Roanoke	-10.3	Watauga	4.3
Swain	-8.7	Jackson	4.5
Patrick	-8.1	Caldwell	5.4
Ashe	-7.8	Carroll	6.3
Botetourt	-7.2	Franklin	13.5
Nelson	-6.4	Wilke	13.8
Bedford	-4.5	Alleghany	14.3
Rockbridge	-4.3	Avery	29.8
Floyd	**-3.7**		

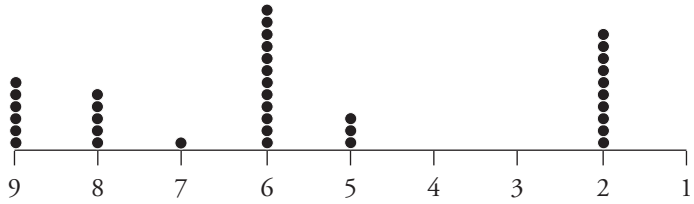
NOTES

Change in Farmland



Urbanization

Urbanization is a measurement of the degree to which land has been developed as towns and cities. The political and economic priorities of more urbanized counties tend to differ from those of less urbanized counties. The concentration of people in towns, cities, and large metropolitan areas creates opportunities for cooperative efforts (such as municipal water systems, public transportation, and a host of non-governmental organizations) but also can increase the incidence of problems such as congestion, air pollution, and habitat fragmentation. The Economic Research Service classifies counties' degree of urbanization along a continuum ranging from completely rural (high numbers) to large metropolitan (low numbers). Within the Blue Ridge Parkway region (1997), six counties are classified as totally rural, while 10 are classified as small metropolitan areas.[24]



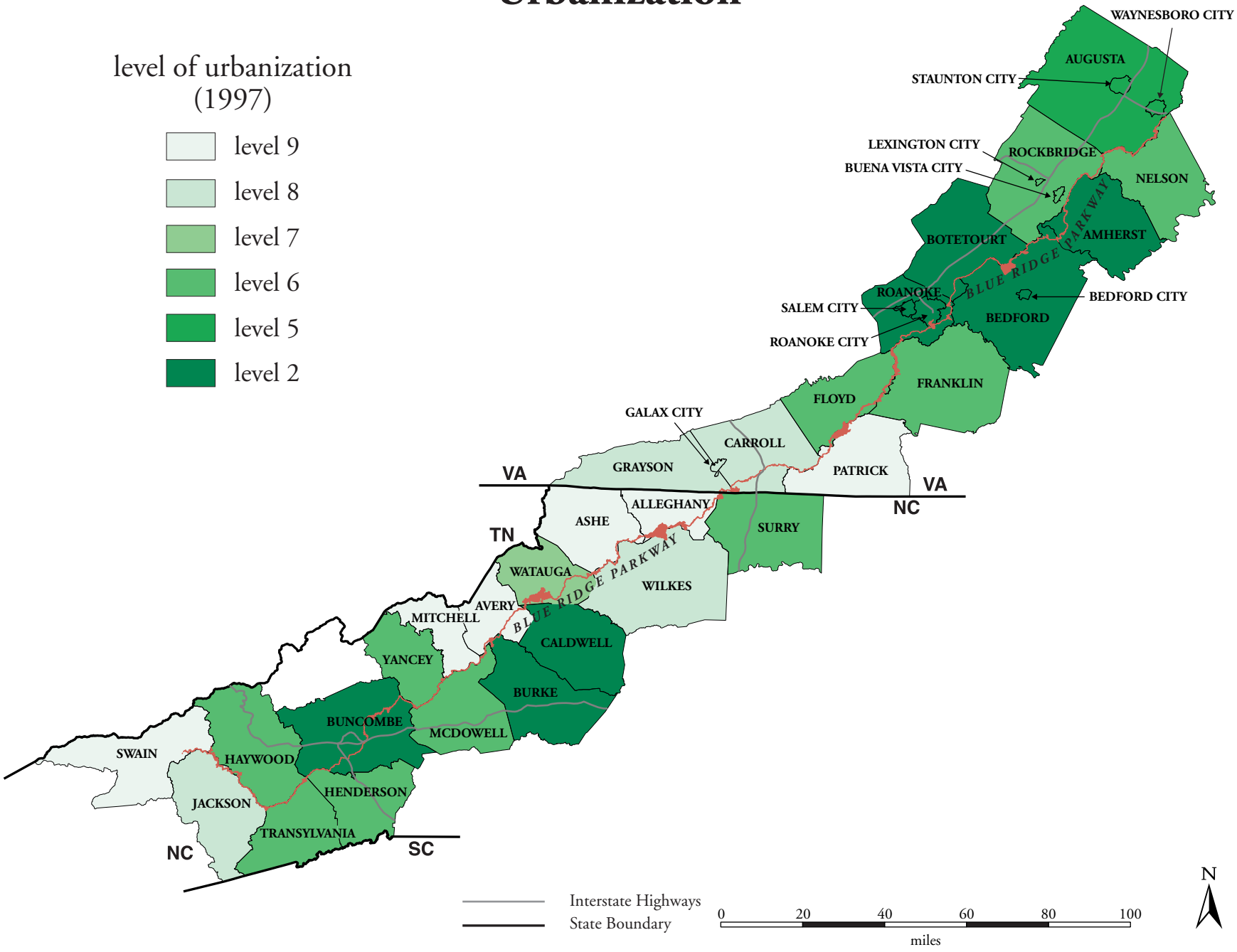
Number Line
showing distribution of data

NOTES

level of urbanization
(1997)

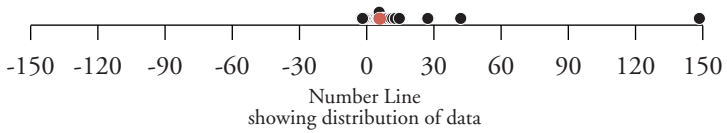
Alleghany	9	Nelson	6
Ashe	9	Rockbridge	6
Avery	9	Augusta	5
Mitchell	9	Buncombe	2
Swain	9	Burke	2
Patrick	9	Caldwell	2
Jackson	8	Amherst	2
Wilkes	8	Bedford	2
Carroll	8	Botetourt	2
Grayson	8	Roanoke	2
Watauga	7	Galax City	8
Haywood	6	Buena Vista City	6
Henderson	6	Lexington City	6
McDowell	6	Staunton City	5
Surry	6	Waynesboro City	5
Transylvania	6	Bedford City	2
Yancey	6	Roanoke City	2
Floyd	6	Salem City	2
Franklin	6		

Urbanization



Change in Building Permits

One indicator of growth in a local economy is the annual change in the number of building permits issued for new privately-owned housing units. Growth in the number of building permits directly implies an accelerating demand for construction labor, supplies, and services. It indirectly implies that families are growing, or that industries or are moving into an area and expanding economic output. Rapid growth can generate new political priorities (such as greater demand for roads and schools) and can increase land values. Growth also alters the human impact within the ecosystem through effects such as increased water consumption, loss of cropland or habitat, or greater valuation of open space. Within the Blue Ridge Parkway region, the average change in the number of building permits issued annually (1990-2000) ranges from a decrease of 2.1% (Amherst) to an increase of 148.4% (Yancey).[25]



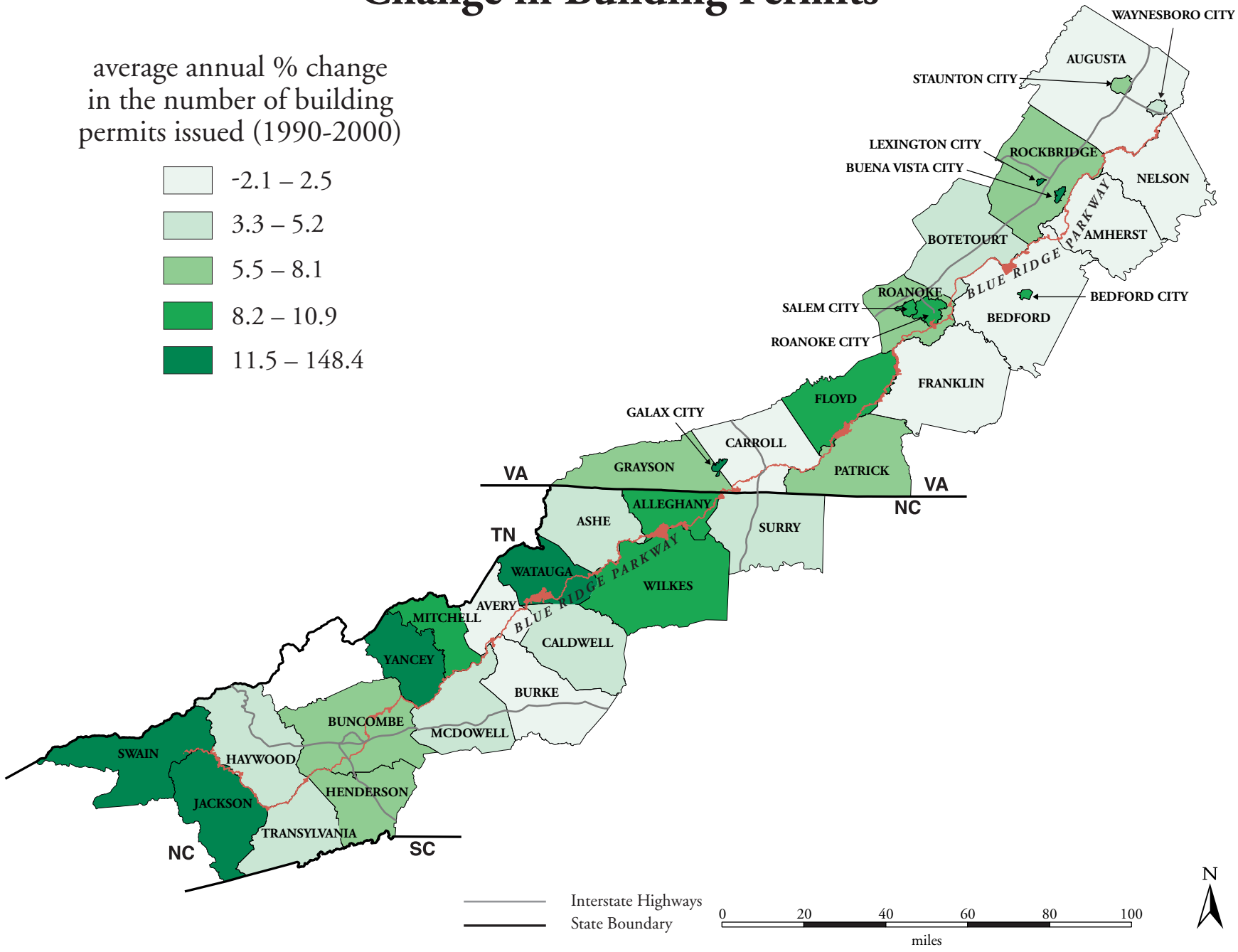
Number Line
showing distribution of data

NOTES

average annual % change in the number of building permits issued (1990-2000)

Amherst	-2.1	Roanoke	6.9
Nelson	-1.9	Patrick	8.1
Augusta	-1.2	Alleghany	8.2
Avery	-0.8	Floyd	8.3
Franklin	1.2	Mitchell	9.0
Carroll	1.5	Wilkes	10.2
Bedford	2.4	Swain	12.6
Burke	2.5	Watauga	12.8
McDowell	3.3	Jackson	14.4
Transylvania	3.4	Yancey	148.4
Surry	4.0	Waynesboro City	3.5
Caldwell	4.2	Staunton City	7.3
Haywood	4.7	Roanoke City	8.7
Botetourt	5.1	Bedford City	9.1
Ashe	5.2	Salem City	10.9
Henderson	5.5	Lexington City	11.5
Grayson	5.5	Buena Vista City	27.3
Rockbridge	**5.7**	Galax City	42.1
Buncombe	6.8		

Change in Building Permits



Conclusion: Using This Atlas for Park Management

A national park functions as part of a regional human ecosystem. A natural ecosystem can be understood in terms of factors such as flora, fauna, rainfall, temperature, elevation, and soil. Similarly, a *human ecosystem* can be understood in terms of factors such as population, commerce, social and cultural practices, politics, and land use patterns.

The regional human ecosystem, like the natural ecosystem, strongly influences the long-term health of the park's natural and cultural resources. Just as a park may be concerned with upstream activities outside its boundaries yet inside its watershed, parks are also concerned with human activities taking place outside their boundaries yet inside their region. Thus, knowledge of natural and human conditions external to a park is as essential to park management as knowledge of internal natural and cultural conditions.

This atlas focuses on human activities and features in the region surrounding Blue Ridge Parkway. Five primary applications for this atlas as a tool for park management are:

- monitoring activities and analyzing trends that could have short or long-term impacts on the park,
- making comparative studies, both within the region and between regions,
- assessing potential social impacts of management decisions,
- supporting collaborative decision-making and public participation, and
- educating park staff and other stakeholders about regional socioeconomic trends.

Monitoring activities and analyzing trends. The standardized data sources and presentation format of this atlas allow it to serve as a baseline for long-term monitoring of human conditions and trends that impact the park, such as immigration, economic shifts, or changes in the level of poverty. These human conditions and trends can have significant implications for park planning and management. For example, the atlas can be consulted to determine trends in the prevalence of English language ability among regional residents. This information could be important in designing interpretive and public participation programs that can increase access to and advocacy on behalf of the park. The atlas can be used to gain knowledge about the overall structure of and local variations in the regional economy. This information could be important to developing a strong collaborative working relationship with regional business leaders. The atlas can be examined to recognize trends in land use. This information could support proactive planning to mitigate potential impacts of development such as habitat fragmentation, degradation of air or water quality, or intrusions upon historic settings and/or scenic values.

Comparative studies. This atlas can support comparative studies of two kinds. First, the atlas can be used to compare counties within the region. By displaying the range of values for a particular indicator or a set of indicators, the atlas can help identify specific counties where it may be desirable to take (or *avoid* taking) certain management actions because of the potential impact on the human ecosystem. Second, the atlas can be used to make comparisons with other park regions. Potential management actions can be evaluated in terms of how effective they have been for another park unit where similar regional socioeconomic factors are involved.

Social impact assessment. Federal law and NPS planning directives require that park managers evaluate the social impacts of potential management actions. The socioeconomic indicators displayed in this atlas can make an important contribution to such social impact assessments. For example, the maps displayed here could be used to help understand the impacts of various park management plans and provide context for assessments at smaller scales, such as local communities.

Collaborative decision-making. In developing general management plans, park staff are directed to "consider the park holistically … as part of the surrounding region" and to conduct planning "as part of cooperative regional planning whenever possible" (Director's Order 1998-2, par. 3.3.1.2). Tools such as this atlas can support the goal of applying a regional perspective to park planning and management. Distribution of this atlas to citizens, elected officials, educators, business and service groups, resource managers, and others can strengthen their ability to effectively participate in park management activities and decision-making. Maps that present facts in a standardized format can be particularly helpful for establishing common ground on which to decide upon management priorities, especially for decisions that affect both the park and the adjacent region.

Education and orientation. The atlas can be used to orient new park staff, as well as central office staff, to some of the basic facts about human activities in the park's region of interest. It can also serve as a tool for sharing information about socioeconomic trends with the public, gateway communities, media, and Congress.

In conclusion, effective park management requires a clear understanding of human activities in the surrounding region that can impact park resources and operations. By providing the "basic facts" about such activities, this atlas can help managers, citizens, and others better provide for the preservation and enjoyment of Blue Ridge Parkway.

Appendices

Appendix 1: Data Sources for Indicators

The data sources used to obtain the measures for the socioeconomic indicators are listed below. The indicators listed on the left correspond to the titles of the maps in the atlas. The measure corresponds to the legends used in the maps and the ranked data tables.

INDICATOR	MEASURE	DATA SOURCE
General Population		
*Total Population	total number of people (2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/population/www/cen2000/tablist.html
Historical Population Change	% change in total number of people (1970-1990)	U.S. Department of Commerce, Census Bureau, http://quickfacts.census.gov/qfd/
*Recent Population Change	% change in total number of people (1990-2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/population/www/cen2000/tablist.html
*Projected Population Change	projected % change in total number of people (2000-2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Population Density Change	% change in average number of people per square mile (1980-2000)	2) U.S. Department of Commerce, Census Bureau, http://quickfacts.census.gov/qfd/
Projected Population Density	projected average number of people per square mile (2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Projected Median Age	projected median age of total population (2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
Urban Population	% total population living in urban areas (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov
Economy and Commerce		
*Industry Earnings	% total earnings by industrial category (1999)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
*Employment by Industry	% employment by industrial category (1999)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Change in Employment by Industry	% change in employment by industrial category (1990-1999)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Projected Change in Industry Earnings	% projected change in earnings by industrial category (2000-2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
Projected Change in Employment by Industry	% projected change in employment by industrial category (2000-2020)	Woods & Poole Economics, Inc. 2002 Complete Economic and Demographic Data Source (CEDDS) on CD-ROM. Washington, DC. Woods & Poole Economics, Inc. provides long-term socioeconomic data projections at the state and local levels, in both hardcopy and electronic format. http://www.woodsandpoole.com
*Poverty	% total population in poverty (1999)	1) U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov 2) U.S. Department of Commerce, Census Bureau, http://eire.census.gov/popest/data/counties/tables/CO-EST2001-12.php

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
Home Based Employment	% employed labor force working at home (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov/
Social and Cultural Characteristics		
*Racial Diversity	% total population belonging to minorities (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov/
*Educational Attainment	% total population 25 years old and over with some college or college degree (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov/
Recreation and Tourism		
Recreation and Tourism Establishments	% total establishments in arts entertainment, recreation, and accommodation services (2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/epcd/cbp/view/cbpview.html
*Recreation and Tourism Revenue	% total sales from arts, entertainment, recreation, and accommodation services (2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/epcd/cbp/view/cbpview.html
*Recreation and Tourism Employment	% total paid employees in arts, entertainment, recreation, and accommodation services (2000)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/epcd/cbp/view/cbpview.html
Seasonal Housing	% total housing units classified for seasonal, recreational, or occasional use (2000)	U.S. Department of Commerce, Census Bureau, http://factfinder.census.gov/
Administration and Government		
*Congressional Districts	Congressional districts (108th Congress)	1) U.S. Department of Commerce, Census Bureau, http://www.census.gov/geo/www/cob/cd108.html 2) U.S. Department of the Interior, National Atlas of the United States, http://nationalatlas.gov/atlasftp.html
*Federal Expenditures	federal expenditures per capita ($) (2001)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/prod/www/abs/cffr.html
Change in Local Government Revenue	% change in local government revenue per capita (1987-1997)	1) U.S. Department of Commerce, Census Bureau, http://www.census.gov/govs/www/cog.html

Appendix 1: Data Sources for Indicators (continued)

INDICATOR	MEASURE	DATA SOURCE
Payments in Lieu of Taxes	total payments transferred to counties (2001)	U.S. Department of the Interior, Bureau of Land Management. Payment In Lieu of Taxes, Fiscal Year 2001. Washington, DC.
Land Use		
*Ecoregions	ecoregion division boundaries (1995)	1) USDA Forest Service, Inventory and Monitoring Institute, http://www.fs.fed.us/land/ecosysmgmt/ecoreg1_home.html 2) Bailey, Robert G. (1995). Description of the Ecoregions of the United States (2nd ed.). Misc. Pub. No. 1391, USDA Forest Service, 108 pp.
*Federal and Indian Lands	federal and Indian land boundaries (2000)	U.S. Department of the Interior, National Atlas of the United States, http://www.nationalatlas.gov/atlasftp.html
*Metropolitan Areas	metropolitan area boundaries (1999)	U.S. Department of Commerce, Census Bureau, http://www.census.gov/geo/www/cob/ma1999.html
*Federal Land Management	% land under federal management (2001)	U.S. Department of the Interior, Bureau of Land Management. Payment In Lieu of Taxes, Fiscal Year 2001. Washington, DC.
Farmland	% land classified as farmland (1997)	1) USDA National Agricultural Statistics Service. Census of Agriculture 1997, http://www.nass.usda.gov/census/ 2) U.S. Department of Commerce, Census Bureau, http://quickfacts.census.gov/qfd/index.html
*Change in Farmland	% change in acres of farmland (1987-1997)	USDA National Agricultural Statistics Service. Census of Agriculture 1997, http://www.nass.usda.gov/census/
*Urbanization	level of urbanization (1997)	U.S. Department of Agriculture, Economic Research Service, http://usda.mannlib.cornell.edu/data-sets/rural/97002/
Change in Building Permits	average annual % change in number of building permits issued (1990-2000)	1) U.S. Department of Commerce, Census Bureau, http://quickfacts.census.gov/qfd/ 2) U.S. Department of Commerce, Census Bureau, Residential Construction Branch, http://www.census.gov/const/www/permitsindex.html

** Denotes a core indicator, common to all atlases in this series. Additional indicators were selected by park managers to include information specific to their particular management needs.*

Appendix 2: Technical Notes on Map Design

Selection of Base Map Data – The regional base map used to map socioeconomic indicators on the preceding pages includes state and county boundaries, interstate highways, major cities, and other selected cities and towns. The roads, cities, and towns are included to provide readers with a few familiar points of reference. It should be emphasized that this is not a general purpose atlas of the region, for it focuses only on socioeconomic indicators.

Choropleth Mapping – For most of the maps, data are grouped by quintiles which vary in shading from light to dark (for low to high values). This shading technique, known as choropleth mapping, is usually applied to ratio data; population density, infant deaths per 1,000 live births, and median income are examples. Maps that display total amounts (such as total population) often use other approaches, such as proportional symbols. For clarity, ease of use, and consistent design, choropleth mapping is used for most of the social indicator data.

Quintile Classification – The choice of a *quintile* classification of the data means that for most maps, counties were divided into five classes. Rather than focusing on the actual numerical value of the indicator for each county, the quintile approach emphasizes the variation in data values among counties. The legend accompanying the map allows the reader to see the actual magnitude of variation among the counties for that indicator. Quintiles make it easy for the reader to make intuitive comparisons among counties; the darkest shaded counties are in the "top fifth," the lightest shaded counties are in the "bottom fifth," and so forth. Quintiles also facilitate comparisons between maps in the atlas ("this county ranks in the bottom quintile on all three of these indicators").

Two notes: (1) Whenever the number of counties cannot be evenly divided by five, the convention for this atlas series is to reduce the size of the highest quintile first, then the next quintile if needed, then the third quintile if needed. Hence thirty-seven counties would be divided into groups of 7, 7, 7, 8, and 8, with the first group of 7 having the highest data values/darkest shading. (2) Counties with identical data values are grouped in the same quintile, even if this results in quintiles of unequal size.

Note on Political Boundaries – The regional base map depicts the formally defined political boundaries of states and counties.

Map Sources – The context map at the beginning of the atlas was generated from Cartesia Software, 1998, MapArt Geopolitical Deluxe – USA (Lambertville, NJ; http://www.mapresources.com). The standard region map used throughout the atlas was generated from U.S. Census Bureau shapefiles. Contextual information (roads and cities) was obtained from the U.S. Geological Survey (http://www.nationalatlas.gov).

Production – Indicator data for the atlas were compiled in Microsoft Excel 98. These were linked to U.S. Census shapefiles using ArcView GIS 3.1. The GIS files were imported into Adobe Illustrator 8.0, with the Avenza MAPublisher 3.5 plug-in, for final map design. Text was prepared in Microsoft Word 98. The final atlas layout (text, maps, graphics) was completed using Adobe PageMaker 6.5.

Appendix 3: Technical Notes on Measurement of Selected Indicators

[1] Persons enumerated in the census were counted as inhabitants of their usual place of residence, which generally means the place where a person lives and sleeps most of the time. This place is not necessarily the same as the legal residence, voting residence, or domicile. In the vast majority of cases, however, the use of these different bases of classification would produce substantially the same statistics, although appreciable differences may exist for a few areas.

[2] For an explanation of Woods & Poole's projection methods see page 11 in the Woods and Poole Technical Documentation manual.

[3] **Population density** is measured as the average number of people per square mile. This number is calculated by dividing the total number of people by the total area per county. In counties with federal lands, excluding these areas from the calculation of population density would result in a higher population density.

[4] see note above on population density.

[5] **Urban population** is measured as the percentage of the total population living in urban areas. An urban area includes all territory, population, and housing units in urbanized areas and in places of 2,500 or more persons outside urbanized areas. An urbanized area has a population concentration of at least 50,000 inhabitants, and generally consists of a central city and the surrounding, closely settled, contiguous territory having a density of at least 1,000 persons per square mile.

The complete criteria are available from the Chief, Geography Division, U.S. Bureau of the Census, Washington, DC 20233.

[6] Economic activity is categorized as belonging to one of four **industry categories**: agriculture/natural resources, construction/manufacturing, sales/services, and government. Individual workers, regardless of their specific job responsibilities, are classified according to the category their overall company or organization belongs to. Thus, while accounting is considered a "service" activity, an accountant for a mining company would be counted as working in "agriculture/natural resources." "Government" includes all federal government workers and all state/local employees, such as teachers, police, firefighters, etc. Even though government jobs may involve construction, natural resource management, or provision of services, they are still counted as belonging to the "government" category.

[7] see note above on industry categories.

[8] see note above on industry categories.

[9] see note above on industry categories.

[10] see note above on industry categories.

[11] **Poverty** is measured as the percentage of the total population living below the poverty level (1999). The poverty level is defined as earnings of $16,700 or less for a family of four persons. Poverty thresholds are applied on a national basis and are not adjusted for regional, state, or local variations in the cost of living.

[12] **Racial diversity** is defined for this measure as the percentage of the population that classifies themselves as being non-White. Diversity by this definition does not necessarily measure the degree of "variety" in the population. For example, a hypothetical county with a 90% Asian population would be considered as being more "diverse" than a county in which each of the six major ethnic groups constituted 10% of the population (in the latter case, diversity would be measured as 60%). The Hispanic or Latino origin category was not included in this measure because persons of Hispanic or Latino origin may be of any race (including White).

[13] For the census, persons are classified according to the highest level of school completed or the highest degree received. The question included instructions to report the level of the previous grade attended or the highest degree received for persons currently enrolled in school.

[14] **Recreation and Tourism** is composted of the arts, entertainment, and recreation sector and the accommodation subsector. Both are part of the North American Industry Classification System (NAICS). For a complete definition of these NAICS categories please consult the following URL (http://www.census.gov/epcd/www/naics.html).

[15] see note above on recreation and tourism.

[16] see note above on recreation and tourism.

[17] Housing unit is a house, apartment, mobile home or trailer, group of rooms, or single room occupied or, if vacant,

intended for occupancy as separate living quarters. Seasonal, recreational, or occasional use refers to vacant units used, or intended for use, only in certain seasons or for weekend or other occasional use throughout the year. A housing unit is vacant if no one is living in it at the time of enumeration, unless its occupants are only temporarily absent. Units temporarily occupied at the time of enumeration entirely by persons who have a usual residence elsewhere are also classified as vacant.

[18] **Federal expenditures** include expenditures, or obligation for, direct payments for individuals, procurement, grants, salaries and wages, direct loans, and guaranteed loans and insurance. Grant awards are reported by county of the initial recipient; thus if the initial recipient is the state government, the county in which the state capital is located is reported as having "received' that "pass-through" grant, even though the monies are subsequently distributed to other local governments.

[19] The U.S. Geological Survey produces the **Federal and Indian Lands** map layer. This map layer does not include any federally and Indian held land that has an areal extent smaller than 640 acres (though a separate map layer for these lands is in preparation). For more information and metadata, consult the following URL (http://www.nationalatlas.gov/fedlandsm.html).

[20] Certain MAs are defined around two or more nuclei. Each MA must contain either a place with a minimum population of 50,000 or a U.S. Census Bureau-defined urbanized area and a total MA population of at least 100,000. For a complete definition, consult the following URL (http://www.census.gov/geo/www/cob/ma_metadata.html).

[21] Federal lands include all tax-exempt federal lands administered by the Bureau of Land Management (BLM), the National Park Service, the U.S. Fish and Wildlife Service, the U.S. Forest Service, federal water projects, and some military installations. The BLM calculates the amount of federal land within counties in order to administer the federal government's payments-in-lieu-of-taxes (PILT) program.

[22] **Farmland** consists primarily of agricultural land used for crops, pasture, or grazing. It also includes woodland and wasteland that is part of a farm operator's total operation.

[23] see note above on farmland.

[24] The Economic Research Service classifies counties according to their level of urbanization. The classification consists of nine mutually-exclusive codes:

METROPOLITAN COUNTIES

1) Counties in large metropolitan areas of 1 million or more residents
2) Counties in small metropolitan areas of less than 1 million residents

NONMETROPOLITAN COUNTIES

Adjacent to a large metro area and

3) contains all or part of its own city of 10,000 or more residents
4) does not contain any part of a city of 10,000 or more residents

Adjacent to a small metro area and

5) contains all or part of its own city of 10,000 or more residents
6) does not contain any part of a city of 10,000 or more residents

Not adjacent to a metro area and

7) contains all or part of its own city of 10,000 or more residents
8) contains all or part of its own town of 2,500 to 9,999 residents
9) totally rural, does not contain any part of a town of 2,500 or more residents

[25] The issuing of **building permits** for privately-owned housing units does not necessarily imply that a community is growing, since any community will experience an ongoing replacement of aging houses and buildings. Also, a catastrophic event such as a major storm or fire can generate a short-term surge in the number of building permits issued. Thus a better indicator of growth is the average annual change in the number of building permits issued over a ten-year period. Changes in local codes or enforcement can also affect the number of building permits issued. This measure includes data about new housing units intended for occupancy and maintained by the occupants. It excludes hotels, motels, and group residential structures such as nursing homes and college dormitories. All public housing and nonresidential buildings are also excluded. For a complete definition, consult the following URL (http://www.census.gov/const/www/newresconstdoc.html).

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